CLAIMS

We claim:

1. A composite comprising a continuous fiber material and a thermoplastic, wherein the composite is capable of being directly adhered to a base metal and the composite has a coefficient of thermal expansion substantially the same as a coefficient of thermal expansion of the base metal.

2. The composite according to claim 1, wherein the continuous fiber material is a carbon fiber material.

3. The composite according to claim 2, wherein the carbon fiber material is woven carbon fiber.

4. The composite according to claim 2, wherein the carbon fibers are at least 6 millimeters in length as measured longitudinally.

5. The composite according to claim 1, wherein the woven carbon fiber material is selected from a group consisting of 5-Harness Satin, 2x2 Twill and plain weave.

6. The composite according to claim 1, wherein the thermoplastic comprises about 70% to about 30% by volume of the composite based on a total volume of the composite.

7. The composite material according to claim 6, wherein the thermoplastic comprises about 60% to about 40% by volume of the composite based on the total volume of the composite.

8. The composite material according to claim 1, wherein the thermoplastic is selected from a group consisting of polyarylene ether ketone, polyarylene ether ketone ketone, polyarylene ether ether ketone, and derivatives thereof

9. An article comprising,

(a) a composite comprising a continuous fiber material and a thermoplastic; and

(b) a base metal, wherein the composite is directly adhered to a first surface of the base metal and the thermoplastic has a coefficient of thermal expansion substantially the same as a coefficient of thermal expansion of the base metal.

10. The article according to claim 9, wherein the continuous fiber material is a continuous carbon fiber material.

11. The article according to claim 9, wherein the article is selected from the group consisting of a mechanical seal face, thrust bearing pad, a journal bearing, and a segmented journal bearing pad.

12. The article according to claim 9, wherein the thermoplastic is selected from a group consisting of polyarylene ether ketone, polyarylene ether ketone ketone, polyarylene ether ether ketone, and derivatives thereof.

13. A method of making an article, comprising

(a) contacting a thermoplastic/fiber material composite with a first surface of a base metal;

(b) contacting a release sheet with a top of the thermoplastic/fiber material composite;

(c) contacting a first surface of a mold with the release sheet and applying heat and pressure to the thermoplastic/fiber material composite sufficient to directly adhere the thermoplastic/fiber material composite to the first surface of the base metal to form an article; and

(d) removing the release sheet from the article.

14. The method according to claim 13, wherein the thermoplastic is selected from a group consisting of polyarylene ether ketone, polyarylene ether ketone ketone, polyarylene ether ether ketone and derivatives thereof.

15. The method according to claim 13, further comprising preparing the first surface of the base metal and a second surface of the base metal to provide a substantially uniform finish to the first and second surfaces of the base metal prior to step (a).

16. The method according to claim 13, further comprising cutting the thermoplastic/fiber material composite such that it has the same transverse cross section as the first surface of the base metal.

17. The method according to claim 16, wherein the thermoplastic/fiber material composite further has the same transverse cross section as a second surface of the base metal.

18. The method according to claim 13, wherein the mold comprises a second metal.

19. The method according to claim 18, wherein the second metal is the same as the base metal.

20. The method according to claim 13, wherein a transverse cross section of the first surface of the base metal is substantially the same configuration as a transverse cross section of the mold.

21. The method according to claim 13, wherein heat and pressure are applied to the thermoplastic/fiber material composite via a heated press which contacts a second surface of the mold and a second surface of the base metal.

22. The method according to claim 13, wherein the pressure is at least about 60 bars.

23. The method according to claim 13, wherein the heat is applied at a temperature which is at least about 400° C.

24. The method according to claim 13, further comprising removing the mold, the release sheet and the article from the heat, and cooling the mold, the release sheet and the article, prior to removing the release sheet.

25. The method according to claim 24, wherein the cooling is effected by placing the mold, the release sheet and the article in a cold press such that at least about 60 bars of pressure is applied until the mold reaches a temperature of about 20°C.

26. The method according to claim 13, wherein the fiber material is a woven carbon fiber material.

27. A composite comprising a fiber material and a thermoplastic, wherein the composite is capable of being directly adhered to a base metal and the composite has a coefficient of thermal expansion substantially the same as a coefficient of thermal expansion of the base metal, wherein the composite is directly adhered to the base metal using compression molding.

28. The composite according to claim 27, wherein the material is a carbon fiber material which is a chopped carbon fiber.

29. The composite according to claim 27, wherein the carbon fiber is continuous carbon fiber material.

30. The composite according to claim 27, wherein the carbon fiber material is continuous woven carbon fiber material.